

WHAT IS CLAIMED IS:

1 1. A method of aligning fibers on a substrate comprising:
 2 placing a grooved substrate on a base proximate to an opening formed through
 3 a top surface of the base;
 4 flowing air through the opening to draw the plurality of fibers down towards
 5 the top surface of the substrate;
 6 placing a plurality of fibers to extend over the substrate and over the opening;
 7 and
 8 bonding the plurality of fibers to the substrate.

1 2. The method of claim 1 wherein the base includes a substrate holding area formed
 2 in the top surface of the base and proximate to the opening, and wherein said placing a
 3 substrate on a base further comprises:
 4 placing the substrate within the substrate holding area.

1 3. The method of claim 2 wherein the substrate includes a first plurality of grooves
 2 formed in a top surface of the substrate and wherein said placing a plurality of fibers further
 3 comprises:
 4 placing one of the plurality of fibers within one of the first plurality of
 5 grooves.

1 4. The method of claim 3 wherein the opening is horizontally longer in a first
 2 dimension than a second dimension relative to the top surface of the base, and wherein said
 3 placing the substrate within the substrate holding area further comprises:
 4 placing the substrate proximate to a side of the opening of the first dimension,
 5 wherein the first plurality of grooves are substantially perpendicular to the side of the first
 6 dimension.

1 5. The method of claim 4 wherein the base includes a second plurality of grooves
 2 formed in the first surface of said base that are spaced from the substrate holding area,
 3 wherein the second plurality of grooves are in substantial alignment with the first plurality of

grooves in the top surface of the substrate, and wherein said placing one of the plurality of fibers further comprises:

placing a first section of one of the plurality of fibers within one of the first plurality of grooves formed in the top surface of the substrate; and

placing a second section of the same one of the plurality of fibers within a corresponding one of the second plurality of grooves formed in the first surface of the base.

6. The method of claim 3 wherein the substrate includes a second plurality of grooves formed in the top surface of the substrate that are spaced from the first plurality of grooves, wherein the second plurality of grooves are in substantial alignment with the first plurality of grooves, and wherein said placing one of the plurality of fibers further comprises:

placing a first section of one of the plurality of fibers within one of the first plurality of grooves; and

placing a second section of the same one of the plurality of fibers within a corresponding one of the second plurality of grooves formed in the top surface of the substrate.

7. The method of claim 5 or 6 further comprising:

applying a bonding material on the plurality of fibers; and

placing a holding cap in contact with the bonding material.

8. A method of aligning fibers comprising:

placing a plurality of fibers on a base to extend over an opening formed through a top surface of the base;

flowing air through the opening to draw the plurality of fibers down towards the top surface of the base;

positioning each of the plurality of fibers in substantial alignment; and

transferring the plurality of fibers to a substrate.

9. The method of claim 8 wherein the base includes a first plurality of grooves formed in the top surface proximate to the opening, said method further comprising:

3 placing one of the plurality of fibers within one of the first plurality of
4 grooves.

1 10. The method of claim 8 wherein the opening is horizontally longer in a first
2 dimension than a second dimension relative to the top surface of the base, and wherein said
3 placing a plurality of fibers further comprises:

4 placing the plurality of fibers substantially perpendicular to a side of the
5 opening of the first dimension.

1 11. The method of claim 9 wherein the base includes a second plurality of grooves
2 formed in the first surface that are spaced from the first plurality of grooves, and wherein
3 said placing one of the plurality of fibers further comprises:

4 placing a first section of one of the plurality of fibers within one of the first
5 plurality of grooves; and

6 placing a second section of the same one of the plurality of fibers within a
7 corresponding one of the second plurality of grooves.

1 12. The method of claim 11 wherein said transferring further comprises:

2 positioning a first surface of a substrate to contact the plurality of fibers,
3 wherein the first surface of the substrate has a bonding material applied to contact the
4 plurality of fibers.

1 13. The method of claim 12 wherein the base includes a plunger slidably coupled to
2 the base, and wherein said transferring the plurality of fibers to a substrate further comprises:
3 sliding the plunger to contact one of the plurality of fibers and the substrate.

1 14. An apparatus for aligning fibers on a substrate, the apparatus comprising:

2 a base having a first opening through a top surface, said base having a
3 substrate holding area formed in the top surface of said base proximate to the first opening;
4 and

5 a substrate held within the substrate holding area, said substrate having a first
6 plurality of aligned grooves formed in a top surface of the substrate.

1 15. The apparatus of claim 14 wherein the first opening connects to a second opening
2 formed in a second surface of said base.

1 16. The apparatus of claim 15 wherein the first opening is horizontally longer in a
2 first dimension than a second dimension relative to the top surface of said base, and
3 wherein the first plurality of grooves in said substrate are substantially perpendicular
4 to a side of the first opening of the first dimension.

1 17. The apparatus of claim 16 wherein said base includes a second plurality of
2 grooves formed in the top surface of said base and spaced away from the substrate holding
3 area, and

4 wherein the second plurality of grooves are in substantial alignment with the first
5 plurality of grooves in the substrate.

1 18. The apparatus of claim 17 wherein the spacing between each of the first plurality
2 of grooves is less than the spacing between each of the second plurality of grooves.

1 19. The apparatus of claim 17 wherein said substrate includes a second plurality of
2 grooves formed in the top surface and spaced away from the first set of grooves, and

3 wherein the second plurality of grooves are in substantial alignment with the first
4 plurality of grooves.

1 20. The apparatus of claim 19 wherein the spacing between each of the first plurality
2 of grooves is less than the spacing between each of the second plurality of grooves.